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### 3. The research methodology of the VALIANT study

#### Introduction

This chapter delves into the methodology employed in the VALIANT research project, which aimed to assess the impact of Virtual Exchange (VE) on teachers and student teachers in European countries and regions. This chapter will outline the core research questions and objectives, data collection process and tools, and data analysis process. The detailed description in this chapter should enable the reader to better understand the setup of the experimental protocol and compare this approach with other similar large-scale projects. This will allow a better evaluation of the strengths and weaknesses of the VALIANT study and understand the research findings described in the following chapters. This section will also provide a detailed description of the surveys that were used to evaluate the VEs.

#### Project Aims and Research Questions

The overarching research question for the VALIANT project was to test the hypothesis that integrating VE programmes into teacher training programmes would provide the target groups (teachers in contexts of isolation and student teachers) with opportunities for innovation, collaboration, digital and intercultural competence development and career planning which would otherwise be difficult to access in rural areas or in times of enforced isolation, such as during the COVID-19 pandemic. We also aimed to establish whether the VE programmes we had developed made

the teaching profession more attractive to student teachers by engaging them in authentic learning and teaching scenarios.

The ability to interact and collaborate successfully in online networks is essential for educators as the COVID-19 pandemic highlighted, and current expectations of teachers and student teachers include the capability to collaborate in virtual classrooms. These online learning settings offer greater flexibility, easier access to resources, and a wider peer community than those in face-to-face settings; however, they also present some challenges that need to be addressed. Among the most often reported ones are feelings of professional isolation and lack of motivation.

Therefore, VALIANT focused specifically on VE as a way of mitigating participants' feelings of professional isolation and enhancing work motivation, self-efficacy, pedagogical development, intercultural and digital competencies, and transversal skills (i.e., time management, team working, negotiation and problem-solving). Therefore, our expectations for the VE programmes included a decrease in participants' feelings of isolation and an increase in the rest of the above-mentioned competences and skills. Other anticipated outcomes were that the VE participants would exhibit understanding of the topics covered in their training modules and express an interest in incorporating virtual communities of practice into their future professional teaching careers. We also expected the student teachers to report that their involvement in the VE programme made the teaching profession more appealing to them.

Specifically, the VALIANT project has five overarching objectives that informed the design of the VEs and ways of assessing their effectiveness:

- (1) To overcome teachers' sense of isolation and to improve levels of motivation and self-efficacy through the networking and collaboration opportunities which emerge from participation in the VE programmes (Study on Policy Measures to improve the Attractiveness of the Teaching Profession in Europe Volume 2, 2013).
- (2) To develop teachers' intercultural collaboration skills, transversal skills, as well as their ability to participate in online collaborative projects and networks (i.e., eTwinning, Erasmus+ KA2 proposals) which are essential for teaching in the modern European classroom (Thematic Working Group "Teacher Professional Development", 2013, p. 7)
- (3) To develop teachers' ability to use digital technologies for professional engagement including professional collaboration, reflective practice and digital continuous professional development (see the DigCompEdu model of teachers' digital competences).

- (4) To raise the awareness of students of Initial Teacher Education of the realities of the teaching profession through online collaboration with in-service teachers across Europe (Study on Policy Measures to improve the Attractiveness of the Teaching Profession in Europe Volume 2, 2013).
- (5) To provide practicing teachers and students of Initial Teacher Education with resources, support, and strategies for career path planning in order maintain interest and engagement in the profession and empowerment in navigating their careers.

Each of the following chapters will explore how VE affected each of these aspects, present results and discuss findings in detail.

## Researching Virtual Exchange in Educational Contexts

As discussed in previous chapters, the last few decades have seen a surge in research focused on understanding the effectiveness and potential benefits of VE in various educational contexts. Notable projects in this area include EVALUATE and EVOLVE, each concentrating on different aspects of VE. For example, EVALUATE (The EVALUATE Group, 2019) assessed the impact of VE on initial teacher education, while EVOLVE (EVOLVE Project Team, 2020) examined the effects of VE on student learning in higher education in general. In contrast, the VALIANT project aimed to assess the impact on both teachers and student teachers, making it unique by including collaboration between these two populations as a key component of the research. Additionally, VALIANT investigated three types of VE exchanges: VE programmes involving only teachers, VE programmes involving teachers & student teachers, and VE programmes involving only student teachers.

The research methodology used in the VALIANT project shares similarities with the methods employed in the aforementioned studies. Like VALIANT, these projects used a mixed methods approach, incorporating both quantitative and qualitative data collection and analysis. For example, the EVALUATE project utilised pre-post-VE questionnaire designs with a control group, and data collection tools included validated questionnaires, closed and open-ended questions, and qualitative interviews to measure the development of intercultural competence, digital-pedagogical

competences, and foreign language competence. Similarly, the EVOLVE project also adopted a mixed methods approach, employing pre- and post-VE questionnaires, student portfolios, and post-hoc interviews with students to investigate development in the areas such as intercultural competence, disciplinary competence, critical digital literacy, and language skills.

Overall, while the methodologies used in these projects share some core similarities with VALIANT in employing mixed methods and gathering data from pre-post tests and interviews, they also show some variations in terms of research sample, specific data collection tools, and analysis techniques. For instance, the number of experimentation rounds varied, with EVALUATE having two rounds of experimentation and VALIANT conducting three rounds. As it will be seen in subsequent sections, the VALIANT project built its methodological approach on the best practice identified in previous large-scale VE projects. This approach enabled VALIANT to gather additional insights to further expand the knowledge about the impact of VE in educational contexts.

In the following sections, a detailed explanation of the VALIANT methodology will be provided. This will give readers a comprehensive understanding of the research design and data collection procedures employed in the project.

## The Experimentation Methodology

The ethical clearance for this project was obtained from the London College of Fashion (LCF) College Research Committee (LCF CRC) and it fully complied with the EU ethics regulation on research with human participants and personal data management. LCF was not involved in the delivery of the VE programmes and was an independent partner of the project who participated in the research ethics process, data collection and data analysis, which reduced research biases.

The research study employed an experimental approach to examine the effectiveness of the VALIANT VE programme. The process of evaluating models of VE is complex and various issues need to be addressed

when choosing a research methodology. For this reason, the research team followed the Commission’s recommendations in the Guidelines for Conducting a European Policy Experiment (J-Pal Europe, 2016) and, as mentioned earlier, used a mixed methods approach (Dörnyei, 2007; Nunan & Bailey, 2009).

The study collected pre-post VE data at three distinct stages (i.e., in the pre, mid, and post VE surveys in each of the three rounds on VEs). At each stage, both qualitative and quantitative data were collected. The quantitative data from this pre-post VE experimental approach allowed the research team to examine the causal effect of the intervention on feelings of isolation, motivation, self-efficacy, intercultural competencies and transversal skills. Quantitative pre-post VE data were triangulated with the qualitative data (answers to the open ended questions in the pre, mid and post VE surveys) in addition to participants’ interviews to provide a comprehensive insight into the outcomes of the experimentation. In addition, this study had a control group of 20 student teachers who completed the pre and post-VE survey but did not take part in the VE. Figure 3.1 below illustrates the process of data collection.

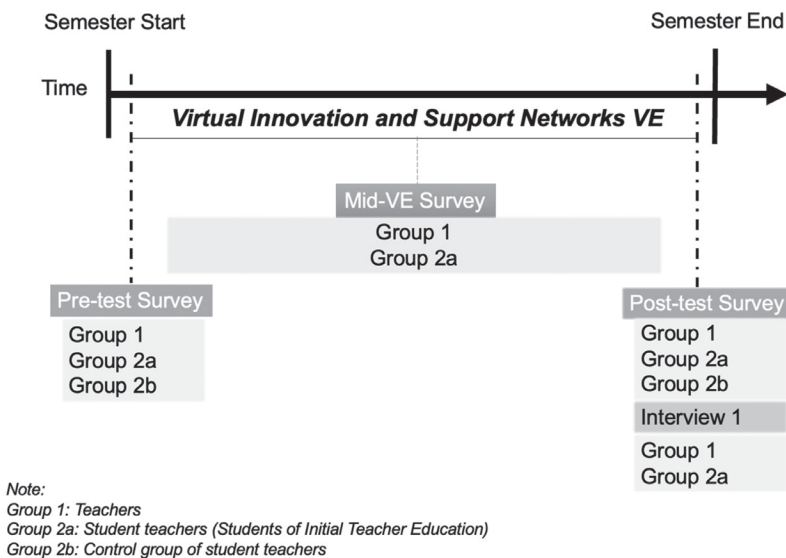


Figure 3.1: Data collection process

The first set of pilot VEs (round 1) was implemented in the autumn semester of 2021. Quantitative and qualitative data collection took place at the beginning, middle and end of the VEs although the control group only completed pre- and post-VE surveys. A preliminary analysis of the data gathered allowed the developers to fine tune the specific VE models on the basis of the feedback gathered, so that they could be improved for implementation in the subsequent semesters with new groups of participants.

Further quantitative and qualitative data were gathered in two field trials (rounds 2 & 3) in the spring semester of 2022 and autumn semester of 2022, which followed the same procedure as in Round 1. During the time frame of the project, a total of 24 VE Programmes were implemented (7 in round 1; 10 in round 2; 7 in round 3) of which 23 were conducted in English and 1 was conducted in Spanish and Portuguese.

### *Research Participants*

Over 1000 teachers and student teachers expressed their interest in taking part in the VE. The primary composition of the sample population consisted of individuals from European countries or regions where the project team members were located. Nevertheless, invitations to participate in the project were also extended to institutions in other countries such as the USA and Brazil. Control groups of student teachers were recruited by two project partners. Participants in the control groups in the first and second round of VEs were given the opportunity to participate in the subsequent rounds of the VEs if interested. Participation in the VE and completion of surveys were all voluntary. No teachers or student teachers were “obliged” to participate and all were given the possibility to opt out. A form of consent was used to request permission from participants for data collection purposes.

In total, 688 participants took part in the VALIANT VEs. Since completion of all the surveys was voluntary, complete data was collected from 460 participants. The final sample also includes the control group of 20 student teachers that completed the pre-VE surveys and post-VE surveys in Rounds 1 and 2. Table 3.1 below presents the summary of VE completers (participants who completed all the surveys) organised by their current occupation for each round of exchanges.

Table 3.1. Participants' profile

		N	%
Autumn 2021	Teachers	81	50
	Student Teachers	81	50
	Total	162	100
Spring 2022	Teachers	51	33.6
	Student Teachers	101	66.4
	Total	152	100
Autumn 2022	Teachers	51	34.9
	Student Teachers	95	65.1
	Total	146	100
Overall	Teachers	183	39.8
	Student Teacher	277	60.2
	Total	460	100

In relation to the country, the majority of the teachers were from Spain (26.9 %), Slovenia (15.1 %), Portugal (14 %), Germany (12.4 %), Turkey (10.8 %), and the rest were from other European countries as well as USA, Brazil, China, Algeria (20.8 %). Most student teachers were from Germany (35 %), Turkey (29.9 %), Spain (17.2 %) and Sweden (5.1 %). The remaining participants were from various European countries, as well as USA, Brazil, and Argentina (12.8 %).

Most of the participants identified as female (87 % teachers; 71 % student teachers) and 1.3 % participants identified as non-binary and gender fluid. The average age of teachers was  $M=40.46$  ( $SD=10.9$ ) and of student teachers was  $M=23.46$  ( $SD=4.5$ ). Teachers had on average  $M=14.69$  ( $SD=9.95$ ) years of teaching experience with the maximum of 38 years.

To better understand the work environment of teachers and if they had a supportive professional community, we asked participants to indicate how isolated they felt in their workplace. In terms of self-identification as feeling isolated in work (i.e., "Would you describe yourself as working in isolation in some way?"), 66.1 % of teachers answered "no", 25.1 % answered "somewhat" and 8.2 % answered "yes". We also asked participants if they were working in rural or urban areas. Overall, 69.8 % of

teachers reported working in rural or somewhat rural areas and 30.1 % did not consider their workplace as being rural.

Similarly, we asked the same questions to student teachers in relation to their study environment. Most student teachers did not identify as feeling isolated in their studies. Many of them stated that they did not feel isolated (76.7 %), felt somewhat isolated (14.8 %) and only a small percentage felt isolated (7 %). Most student teachers (70 %) also had some teaching experience (internship) and out of them 69.4 % reported that the internship took place in rural or somewhat rural areas. However, the majority stated they did not feel isolated (51 %) during their internship. Despite these results, some reported feeling at least some level of isolation (27.2 %). The remaining 21.8 % did not answer the question.

### *Quantitative Data Collection Tools and Instruments*

As already mentioned above, the main tool for data collection was a survey which comprised a series of closed ended items that had already been validated in previous studies but that were adapted for their use in the VALIANT project. The surveys with all adapted versions of the items were pilot tested prior to their use in the project. The pre- and post-VE surveys were identical for measuring self-reported levels of isolation, motivation, self-efficacy, digital competence and attitude, transversal skills and intercultural competences. The isolation and motivation items were adapted to the context of student teachers and teachers (i.e., context of studying or context of work), and self-efficacy was only measured for teachers. All the other items remained the same for all participants. The post-VE survey also included 5 questions relating to the satisfaction with the VE experience. The survey was in English and participants overall rated it easy to understand (85.47 % average rating for easiness) and for this reason they did not think it was essential for them to complete it in their own language (17.04 % average rating for essentiality of translation). In addition, participants also answered a series of open-ended questions included in the pre-, mid- and post-VE surveys relating to the areas already mentioned above. This allowed the researchers to gather qualitative data. These questions were also in English, but participants could write the answers in their preferred language. The surveys will be described in detail below. The full survey can be accessed online on the VALIANT website <https://valiantproject.eu/>



Motivation in the pre- and post-VE surveys was measured using the Multidimensional Work Motivation Scale (MWMS; Gagné et al., 2015). The items were adapted to participants' profiles and therefore they focussed on either work (for teachers) or study (student teachers). The first version of the survey consisted of 15 questions that measured intrinsic regulation/motivation, identified regulation, introjected regulation, external regulation and amotivation. Responses were recorded on a 0 (not at all) to 100 (completely) scale. After Round 1 of the exchange, the questions that lacked reliability (Cronbach's  $\alpha < 0.7$  in either teachers or student teachers' samples) were removed resulting in the three final domains that were measured in the study and analysed i.e., intrinsic regulation (Cronbach's  $\alpha > 0.84$ ), identified regulation (Cronbach's  $\alpha > 0.83$ ), and external regulation (Cronbach's  $\alpha > 0.75$ ).

Isolation was measured across a number of domains such as physical isolation and informational isolation (Workplace Social Isolation scale; Orhan et al., 2016), social isolation (Social and Emotional Loneliness Scale for Adults, SELSA; DiTommaso & Spinner, 1993) and emotional isolation (SELSA-S scale; DiTommaso et al., 2004). All the items in the scale were adapted to the participants' professional environment (study for student teachers or work for teachers) and responses were recorded on a scale from 0 (strongly disagree) to 100 (strongly agree). The overall measure of professional isolation was computed by aggregating all the items across three dimensions of isolation to assess overall levels of isolation. The items showed good reliability across all three rounds of data collection (Cronbach's  $\alpha > 0.75$ ).

After the analysis of the qualitative open-ended questions collected during VALIANT Rounds 1 and 2, it became apparent that the measure of overall isolation described above did not adequately capture the gains participants made in their ability to connect with people and expand their professional network as a result of VE participation. These gains however, seemed to be important in mitigating professional isolation. Thus, we summarised these changes in a VE Impact on Isolation survey that consisted of 10 statements and assessed participants' beliefs about the benefits of the VE for building supportive professional community/connections. The items asked participants about whether VE helped them to feel part of the teaching/student community, feel connected with other teachers/students, have good professional support, have better interactions with colleagues, and value current work/study conditions. This new survey was only used

in Round 3 of the VALIANT data collection process. The responses were recorded on a scale from 0 (strongly disagree) to 100 (strongly agree) and the scale showed excellent reliability (Cronbach's  $\alpha > 0.9$ ).

Intercultural competence was measured across 4 dimensions. The cross-cultural collaboration items were taken from the Stevens Initiative (2020) collection of VE survey items. Items on verbal and non-verbal behaviours were taken from the Cultural Intelligence Scale (CQS; Ang et al., 2007); Finally, items relating to perspective-taking and interest in learning about cultures were taken from the PISA Global Competence questionnaire (OECD, 2018). The survey overall included 19 items and responses were recorded on a scale from 0 (strongly disagree) to 100 (strongly agree). Each of the measured skills was computed by averaging out the scores of their respective items. The reliability for each of these 4 domains was very high and therefore, item reduction was done for the survey used in Round 3. The shortened survey consisted of 13 items and showed very high reliability (Cronbach's  $\alpha > 0.81$ ).

Digital competences and attitudes for online collaboration were assessed using modified items from the DigCompEdu Framework for Citizens 2.1 (Carretero Gomez et al., 2017). Initially 5 questions were used to measure digital competence and 5 to measure digital attitudes. The responses were recorded on a scale from 0 (strongly disagree) to 100 (strongly agree). The reliability of the survey in Rounds 1 and 2 was very high and therefore item reduction was possible. In Round 3 of data collection a shorter version of the survey was used with 3 questions measuring competence and 3 questions measuring attitude. The reliability of the shortened survey was high (Cronbach's  $\alpha > 0.78$ ).

Self-efficacy was measured using items from selected domains from two validated questionnaires. Efficacy to influence decision making, efficacy to enlist community involvement, and efficacy to create a positive school climate were adapted from the Teacher Self-efficacy Scale (Bandura, 2006). In addition, self-efficacy in instructional strategies and self-efficacy for student engagement were taken from the Teachers' Sense of Self-Efficacy Scale (TSSES; Klassen et al., 2009). The survey was only given to teachers and responses were recorded on a scale from 0 (not at all) to 100 (a lot). The overall levels of professional self-efficacy were calculated by averaging all the items in this survey which showed excellent reliability (Cronbach's  $\alpha > 0.88$ ).

Transversal skills were measured using two existing questionnaires. Items relating to teamwork and negotiation skills were taken from the eLene4work self-assessment tool (2021) and adapted to a context of work or study. Items relating to time management and problem-solving were taken from the Model of Soft Skills Assessment tool (MOSSA; Ducange et al., 2016) and were also modified to the previously mentioned contexts. The survey overall consisted of 11 items and responses were recorded on a scale from 0 (strongly disagree) to 100 (strongly agree). Each of the measured skills were computed by averaging out the scores for their respective items. The reliability for each of the domains was very high (Cronbach's  $\alpha > 0.81$ ). In addition, one item was added to this scale to test whether participants were answering questions meaningfully (i.e., "When answering this question, please draw the slider to forty for validation of answers").

### *Qualitative Data Collection Tools and Instruments*

The qualitative data for this study were collected through open-ended questions at three different times: before, during, and after the VE. The pre-survey and post-survey included open-ended and close-ended questions whereas the mid-VE survey only contained open-ended questions that were sent to the participants half-way through the VE.

The pre-VE survey had four open-ended questions, which prompted participants to write about their motivations and expectations regarding the VE. These questions aimed to gather insights into participants' initial thoughts and hopes regarding the experience. The mid-VE survey consisted of six open-ended questions that encouraged participants to reflect on their VE experience, including their learning outcomes and how these experiences had influenced their current work or study environment. These questions sought to delve deeper into participants' perceptions and observations during the mid-VE phase. Finally, the post-VE survey included seven open-ended questions. Participants were asked to reflect on their overall experience, including what they had learned and the impact of the VE in their work or study. These questions aimed to capture participants' final impressions and the lasting effects of their engagement in the VEs. By utilising these open-ended questions alongside the quantitative survey, the researchers obtained a comprehensive understanding of participants'

perspectives and experiences, enabling a layered and richer analysis of the data to assess the impact of the VALIANT project.

In addition to the open-ended survey questions, other qualitative data were collected through interviews, recordings of some sessions, portfolios and self-reflection videos. After consent was granted by participants, data collected with these instruments were anonymised in order to comply with GDPR regulations and data analysis and discussion of findings have been included in the case studies section in the book.

## Data Analysis

### *Quantitative Data Analysis*

The quantitative data analysis was conducted using SPSS. The pre-, mid-, and post-VE surveys from each VE from across three rounds of exchanges were compiled together into one dataset. The participants were anonymised and all incomplete data cases and participants who had responded incorrectly to the test questions were removed prior to the analysis. The study variables were computed and the reliability for the surveys and their subscales tested using Cronbach's alpha. The data was scanned for outliers (there were no extreme cases) and variables' distribution was examined. The majority of the variables were not normally distributed and therefore, non-parametric (distribution-free tests) that make no assumption about the distribution of the data were used to test the research hypotheses (i.e., that integrating VE programmes into teacher training will enhance teachers' and student teachers' intrinsic motivation, digital competences, transversal skills and intercultural competences, and teachers' self-efficacy, as well as reduce feelings of isolation). This decision was made because there is little difference in the power and robustness of the tests when sample size is large. Both parametric and non-parametric tests provide reliable results. However, using non-parametric tests protects us from inaccurate overestimation of the findings when we look at how the change happens in different VE types, VE rounds and separately for teachers and student teachers samples. Thus, in the large samples (i.e., like the one in this study)

non-parametric tests are powerful in detecting both statistically and practically significant changes. Descriptive statistics (Median, Means and SD as well as graphical representations of the data) was used to explore the dataset and get the general understanding of the data as well as demonstrate observed patterns. Finally, Inferential statistics (i.e., Wilcoxon Sign-Rank Test) was used to test the above-mentioned research hypotheses.

### *Qualitative Data Analysis*

For the analysis of the qualitative data, codebooks were created that included the frameworks for analysis of the different variables. These were based on theoretical frameworks already tested and validated for each of the variables as explained in the section titled “Quantitative Data Collection Tools and Instruments” above. The only exception to this were the variables of isolation, pedagogical development and self-efficacy, since not one specific theoretical framework was found and therefore researchers had to develop their own framework for data analysis. These codebooks, with their comprehensive list of codes and their corresponding definitions were then introduced in NVivo and MAXQDA in the form of nodes, and other new categories (nodes) were added to code all data observed. These categories included:

- Other learning or achievements: When participants reported other learning gains that were not mentioned in the specific framework of analysis
- General comments: When participants made comments describing their overall experiences in the VE
- Denying any learning: When participants reported that they had learned nothing new
- Suggestions: When participants put forward ideas for improving the experience and learning in VE
- Problems: When participants reported problems or challenges they faced during their participation in the VE
- Uncertain: When coders were uncertain about where they should code a unit of data. In this case coders held discussions and either coded the segments into the existing codes or created new ones.

When analysing the qualitative data, researchers took approaches which had elements of both thematic analysis (Braun & Clarke, 2022) and content analysis (Hsieh & Shannon, 2005). These methods encompassed the development of themes derived from the identification of codes and sub-codes in codebooks which are presented in each individual chapter within this book. The frequency of codes was collected in the codebooks – something which is more common to a qualitative content analysis approach. While frequency of occurrence is not necessarily always considered an indicator of significance in qualitative coding (Saldana, 2013), it is nevertheless a common tool in many approaches to qualitative analysis and Weber (1990) argues that high quality content analysis uses both quantitative and qualitative analysis of texts.

Most areas under study used a deductive approach, employing codes based on existing frameworks (e.g., frameworks relating to motivation, digital competence, intercultural competence). However, when no previous theoretical framework was known in the area under research that could help code and analyse the qualitative data (e.g., isolation, self-efficacy), the researchers had to first look at the collected data in order to inductively develop codes and sub-codes that would underpin the qualitative analysis.

To ensure reliability of coding, one researcher coded all data and a second researcher coded 20 % of all data in each of the rounds. Regular meetings were held between the coders to ensure that nodes and descriptions together with examples of coding were agreed upon by both coders. Percentage of reliability was  $\geq 80$  for all variables. Following Braun and Clarke (2022), the use of testing reliability aimed to mitigate biased results that could arise from the subjectivity of a single coder.

## Monitoring and Quality Control Measures

### *Peer Evaluation*

To maintain a thorough and meticulous approach towards quality control in the various stages of design, data gathering, and data analysis, the project coordinator took the initiative to appoint an external peer reviewer.

This reviewer played a crucial role in ensuring that the project adhered to rigorous standards. In addition, the academic members involved in the research process actively engaged in reviewing each other's work as well as the work of other collaborators during the data collection and analysis phases. This comprehensive review process encompassed both statistical analysis and the coding of qualitative data.

Moreover, the research team evaluated and refined the data gathering tools and methods after each phase of collection and analysis. This iterative approach allowed the team to identify any potential shortcomings or areas for improvement and to optimise the effectiveness and efficiency of the data collection tools for subsequent rounds.

### *Intellectual Property Rights*

In order to maximise impact in terms of the number of people who will be positively affected by the experiment and to ensure the sustainability of this impact, all the project outputs (tools, best practices, materials, co-authored artefacts) have been produced as Open Educational Resources (OERs) and Open Educational Practices (OEPs). Using OERs and OEPs will contribute to the long-term follow-up of the project after its completion and to the up-scaling of its results through peer-learning at a European level. This is in line with the project's goals towards the professional development of teachers, not only for the ones who were recruited for the purposes of VALIANT, but also for a bigger number of teachers who will be able to reuse the project's outputs.

## Conclusion

In this chapter, the VALIANT project's research methodology was presented. The chapter outlined the core research questions and objectives of the project, as well as the data collection and analysis processes. The project adopted an experimental approach with three types of VE exchanges and utilised a mixed methods approach, collecting both qualitative and quantitative data from over 400 participants.

The subsequent chapters will delve into detailed results for each of the variables, exploring the impact of VE on teachers and student teachers, and highlighting the strengths and weaknesses of the VALIANT research project. The findings are expected to provide valuable insights for enhancing teacher training and professional development, especially in the context of online collaboration.

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